SLOVENSKI STANDARD
oSIST prEN ISO 29463-3:2018

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Zelo učinkoviti filtri in filtrirno sredstvo za odstranjevanje delcev iz zraka - 3. del: Preskušanje ravnih filtrskih medijev (ISO 29463-3:2011)

High-efficiency filters and filter media for removing particles in air - Part 3: Testing flat sheet filter media (ISO 29463-3:2011)

Schwebstofffilter und Filtermedien zur Abscheidung von Partikeln aus der Luft - Teil 3: Prüfung des planen Filtermediums (ISO 29463-3:2011)

Filtres à haut rendement et filtres pour l'élimination des particules dans l'air - Partie 3: Méthode d'essai des filtres à feuille plate (ISO 29463-3:2011)

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ICS:

13.040.99	Drugi standardi v zvezi s kakovostjo zraka	Other standards related to air quality
91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning systems

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INTERNATIONAL STANDARD

ISO
29463-3

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High-efficiency filters and filter media for removing particles in air —

Part 3:
Testing flat sheet filter media

Filtres à haut rendement et filtres pour l'élimination des particules dans l'air —

Partie 3: Méthode d'essai des filtres à feuille plate

Reference number
ISO 29463-3:2011(E)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 29463-3 was prepared by Technical Committee ISO/TC 142, *Cleaning equipment for air and other gases*.

ISO 29463 consists of the following parts, under the general title *High-efficiency filters and filter media for removing particles in air*:

— *Part 1: Classification, performance, testing and marking*

— *Part 2: Aerosol production, measuring equipment, particle-counting statistics*

— *Part 3: Testing flat sheet filter media*

— *Part 4: Test method for determining leakage of filter element — Scan method*

— *Part 5: Test method for filter elements*

Introduction

ISO 29463 (all parts) is derived from EN 1822 (all parts) with extensive changes to meet the requests from non-EU p-members. It contains requirements, fundamental principles of testing and the marking for high-efficiency particulate air filters with efficiencies from 95 % to 99,999 995 % that can be used for classifying filters in general or for specific use by agreement between users and suppliers.

ISO 29463 (all parts) establishes a procedure for the determination of the efficiency of all filters on the basis of a particle counting method using a liquid (or alternatively a solid) test aerosol, and allows a standardized classification of these filters in terms of their efficiency, both local and overall efficiency, which actually covers most requirements of different applications. The difference between ISO 29463 (all parts) and other national standards lies in the technique used for the determination of the overall efficiency. Instead of mass relationships or total concentrations, this technique is based on particle counting at the most penetrating particle size (MPPS), which, for micro-glass filter mediums, is usually in the range of 0,12 μm to 0,25 μm. This method also allows testing ultra-low penetration air filters, which was not possible with the previous test methods because of their inadequate sensitivity. For membrane filter media, separate rules apply, and they are described in ISO 29463-5:2011, Annex B. Although no equivalent test procedures for testing filters with charged media is prescribed, a method for dealing with these types of filters is described in ISO 29463-5:2011, Annex C. Specific requirements for test method, frequency, and reporting requirements can be modified by agreement between supplier and customer. For lower efficiency filters (group H, as described below), alternate leak test methods described in ISO 29463-4:2011, Annex A can be used by specific agreement between users and suppliers, but only if the use of these other methods is clearly designated in the filter markings as described in ISO 29463-4:2011, Annex A.

There are differences between ISO 29463 (all parts) and other normative practices common in several countries. For example, many of these rely on total aerosol concentrations rather than individual particles. For information, a brief summary of these methods and their reference standards are provided in ISO 29463-5:2011, Annex A.

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High-efficiency filters and filter media for removing particles in air —

Part 3:
Testing flat sheet filter media

1 Scope

This part of ISO 29463 specifies the test procedure for testing the efficiency of flat sheet filter media. It is intended for use in conjunction with ISO 29463-1, ISO 29463-2, ISO 29463-4 and ISO 29463-5.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 29463-1:2011, *High-efficiency filters and filter media for removing particles in air — Part 1: Classification, performance, testing and marking*

ISO 29463-2:2011, *High-efficiency filters and filter media for removing particles in air — Part 2: Aerosol production, measuring equipment, particle-counting statistics*

ISO 29463-4:2011, *High-efficiency filters and filter media for removing particles in air — Part 4: Test method for determining leakage of filter element — Scan method*

ISO 29463-5:2011, *High-efficiency filters and filter media for removing particles in air — Part 5: Test method for filter elements*

ISO 29464[1]), *Cleaning equipment for air and other gases — Terminology*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 29463-1, ISO 29463-2 and ISO 29464 apply.

4 Symbols and abbreviations

Table 1 presents the quantities (terms and symbols) used in this part of ISO 29463 to represent measurement variables and calculated values. The values should be inserted in the equation given for these calculations in the units specified.

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1)   To be published.

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Table 1 — Quantities, symbols and units

Term	Symbol	Unit	Equation for the calculation
Measured variables			
Exposed area	A	cm^2	
Test volume flow rate	$\dot{V}$	cm^3/s	
Pressure drop	Δp	Pa	
Mean particle diameter	$\bar{d}_{\mathrm{p}}$	μm	
Particle number	N	—	
Sampling volume flow rate	$\dot{V}_{\mathrm{s}}$	cm^3/s	
Sampling duration	t	s	
Calculated quantities			
Filter medium face velocity	u	cm/s	$u = \dfrac{V}{A}$
Mean differential pressure	$\Delta\bar{p}$	Pa	$\Delta\bar{p} = \dfrac{1}{n}\sum_{i=1}^{n}\Delta\bar{p}_i$
Particle number concentration	c_{N}	cm^{-3}	$c_{\mathrm{N}} = \dfrac{N}{\dot{V}_{\mathrm{s}}\cdot t}$
Penetration for particles in size range i	P_i	a	$P_i = \dfrac{c_{N,\mathrm{d},i}}{c_{N,\mathrm{u},i}}$ b
Mean penetration	$\bar{P}$	a	$\bar{P} = \dfrac{1}{n}\sum_{i=1}^{n}P_i$
Mean efficiency	$\bar{E}$	a	$\bar{E} = 1 - \bar{P}$
Number of particles for the upper or lower limit of the 95 % level of confidence	$N_{95\,\%}$	—	ISO 29463-2:2011, Clause 7
Penetration as upper limit value for the 95 % level of confidence	$P_{95\,\%,i}$	a	$P_{95\,\%,i} = \dfrac{c_{N,\mathrm{d},95\,\%,i}}{c_{N,\mathrm{u},95\,\%,i}}$ b
Mean penetration as upper limit value for the 95 % level of confidence	$\bar{P}_{95\,\%}$	a	$\bar{P}_{95\,\%} = \dfrac{1}{n}\sum_{i=1}^{n}P_{95\,\%,i}$
Mean efficiency as lower limit value for the 95 % level of confidence	$\bar{E}_{95\,\%}$	a	$\bar{E}_{95\,\%} = 1 - \bar{P}_{95\,\%}$

a   These quantities are usually given as a percentage.

b   The index, u, refers to upstream particle counts, and the index, d, refers to downstream particle counts.